Climate Change Impacts in Alaska Implications for Community Health

Anchorage Alaska

April 16, 2015

Michael Brubaker

Alaska Native Tribal Health Consortium

mbrubaker@anthc.org


Anchorage, Alaska
Source: Wikipedia

e Alaska Native Tribal Health Consortium

Source: ANTHC

We provide comprehensive health services to rural Alaskans:

Medical

Engineering

Public Health

The Alaska Tribal Health System applies a "One Health" approach recognizing that healthy environment,

Photo courtesy Nikolski IRA


and healthy wildlife,
Photo by Delores Kochuten

are necessary for healthy people.

Climate change is causing major changes in the environment.

Photo by Ben Jones


Climate change also has health benefits.
Photo by Ryan Brubaker

Center for Climate and Health

To assist the tribal health system in understanding the effects of climate change, and to raise awareness and encourage strategies and responses that protect public health.

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

We look at the effect of climate change on these five categories of health:

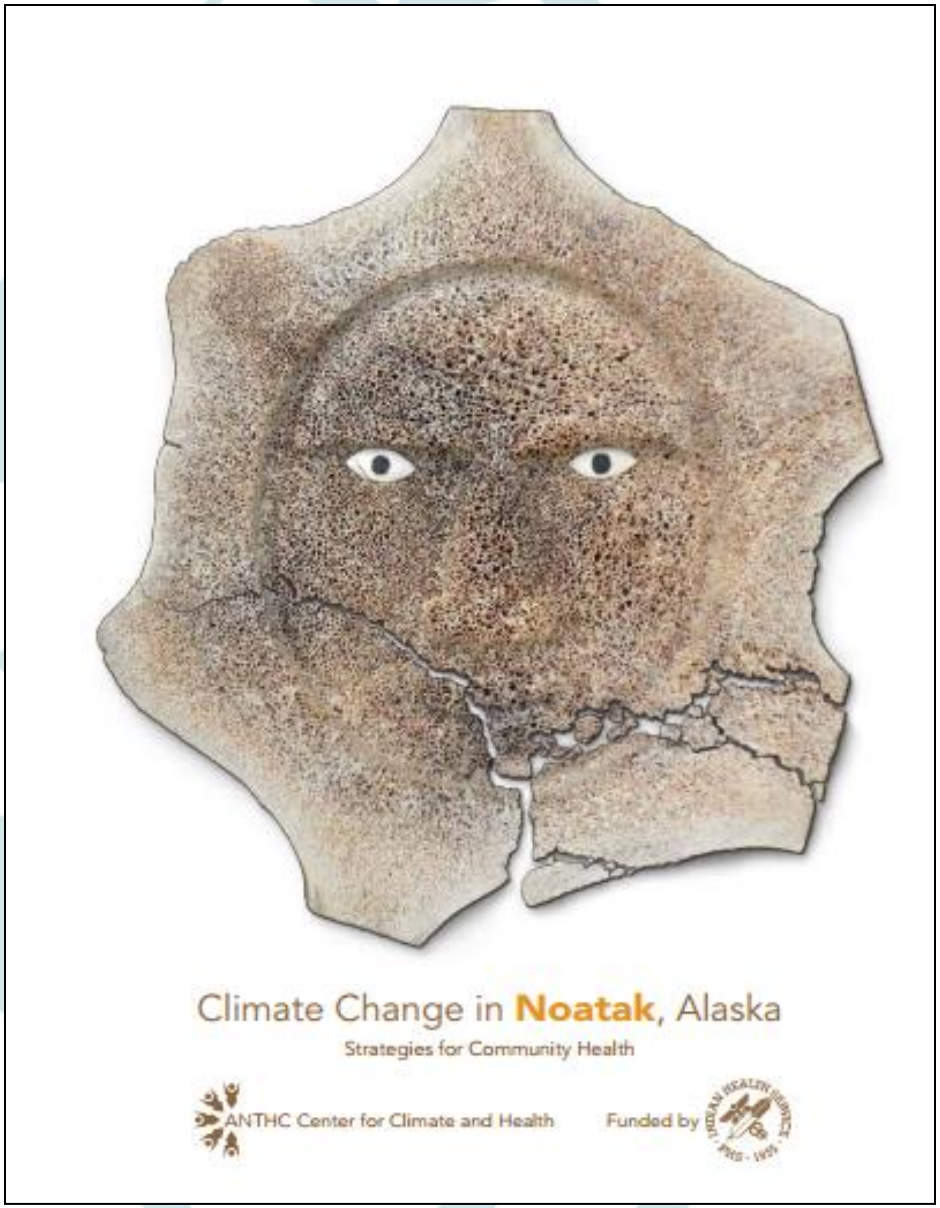
Acute or Chronic Disease

Mental Health

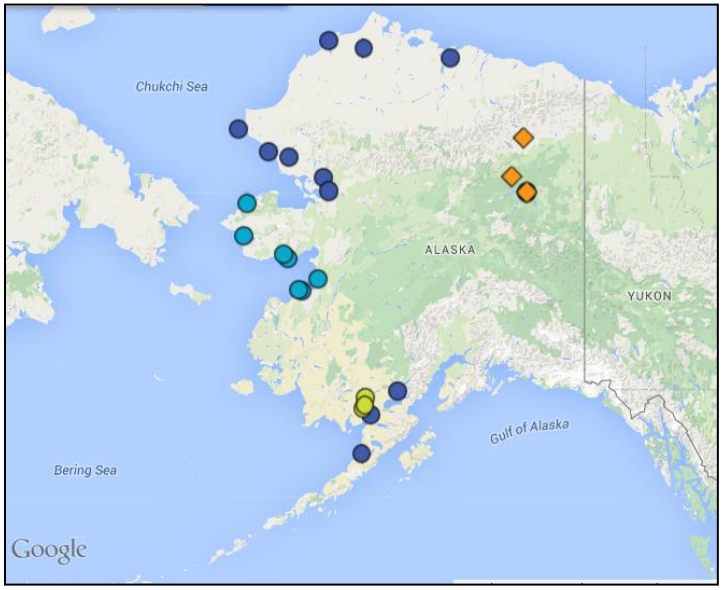
Food Safety and Security

Unintentional Injury

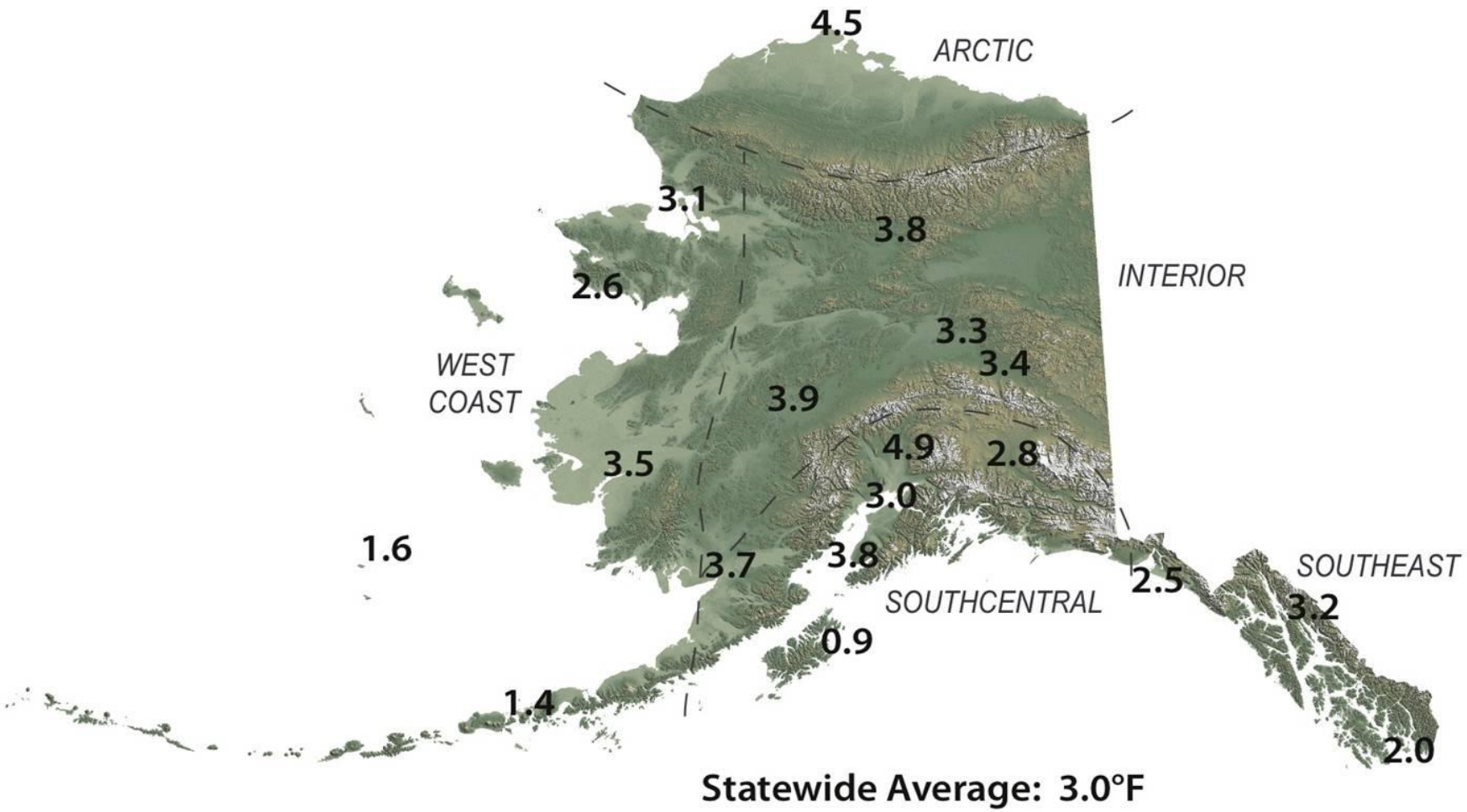
Water Safety and Security



Since 2009 , we have been visiting communities across Alaska, identifying the connections between climate change and health.



Total Change in Mean Annual Temperature (°F), 1949 - 2009

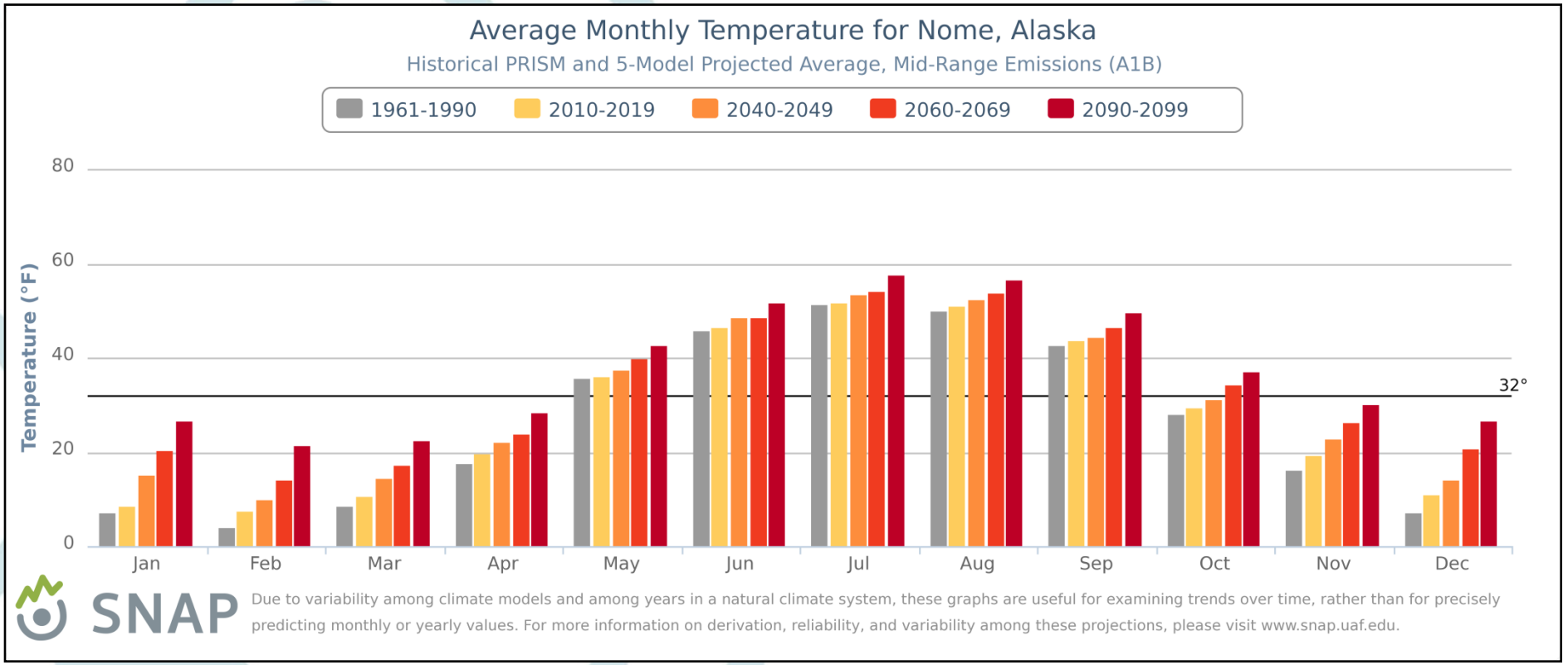


Statewide Average: 3.0°F

Alaska Climate Research Center

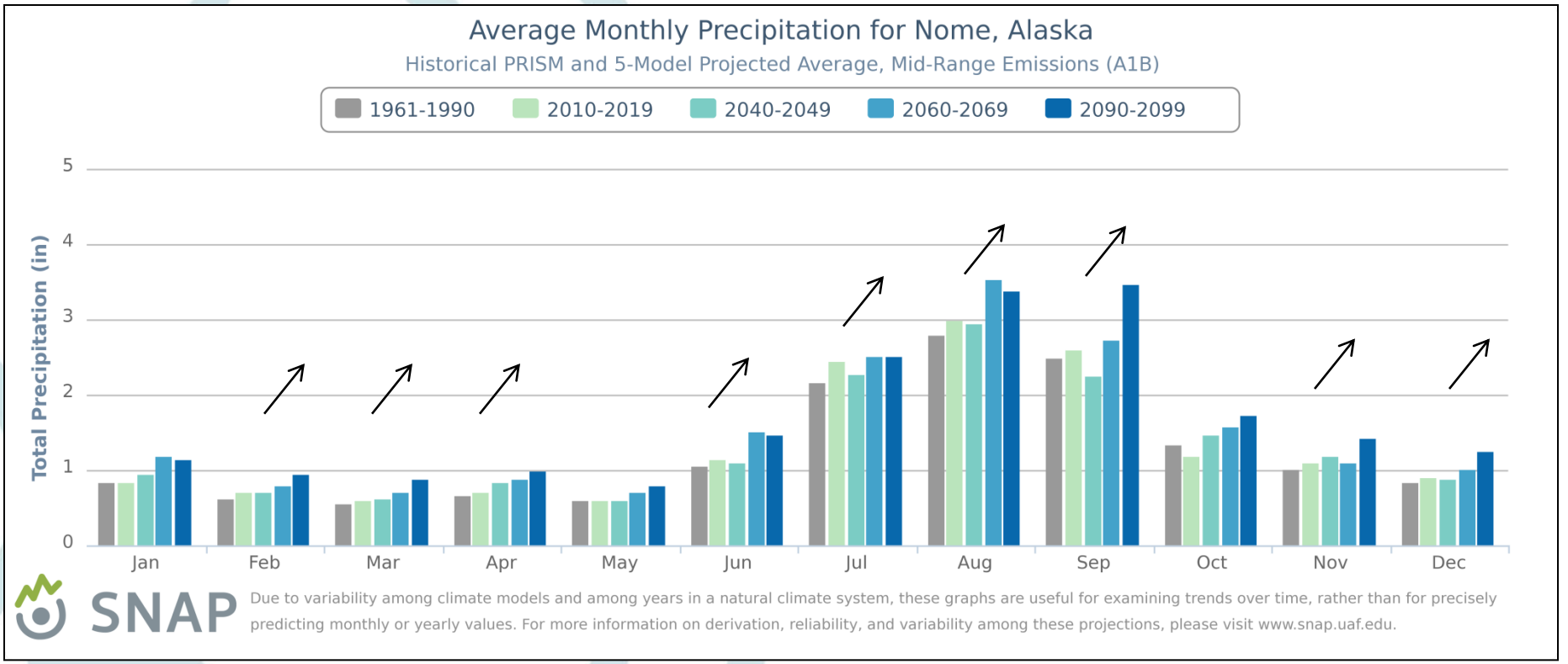
Geophysical Institute, University of Alaska Fairbanks

Warmer

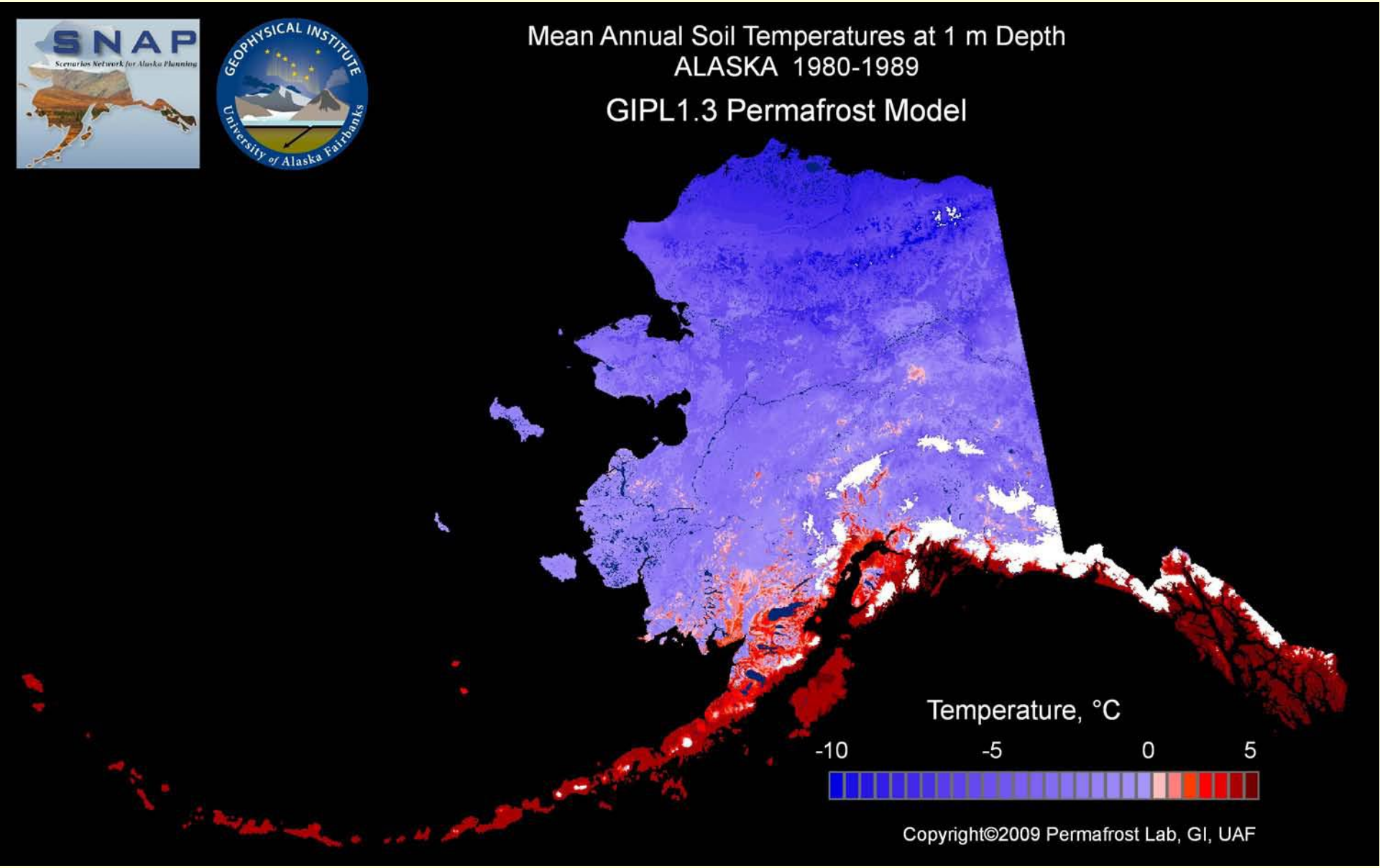


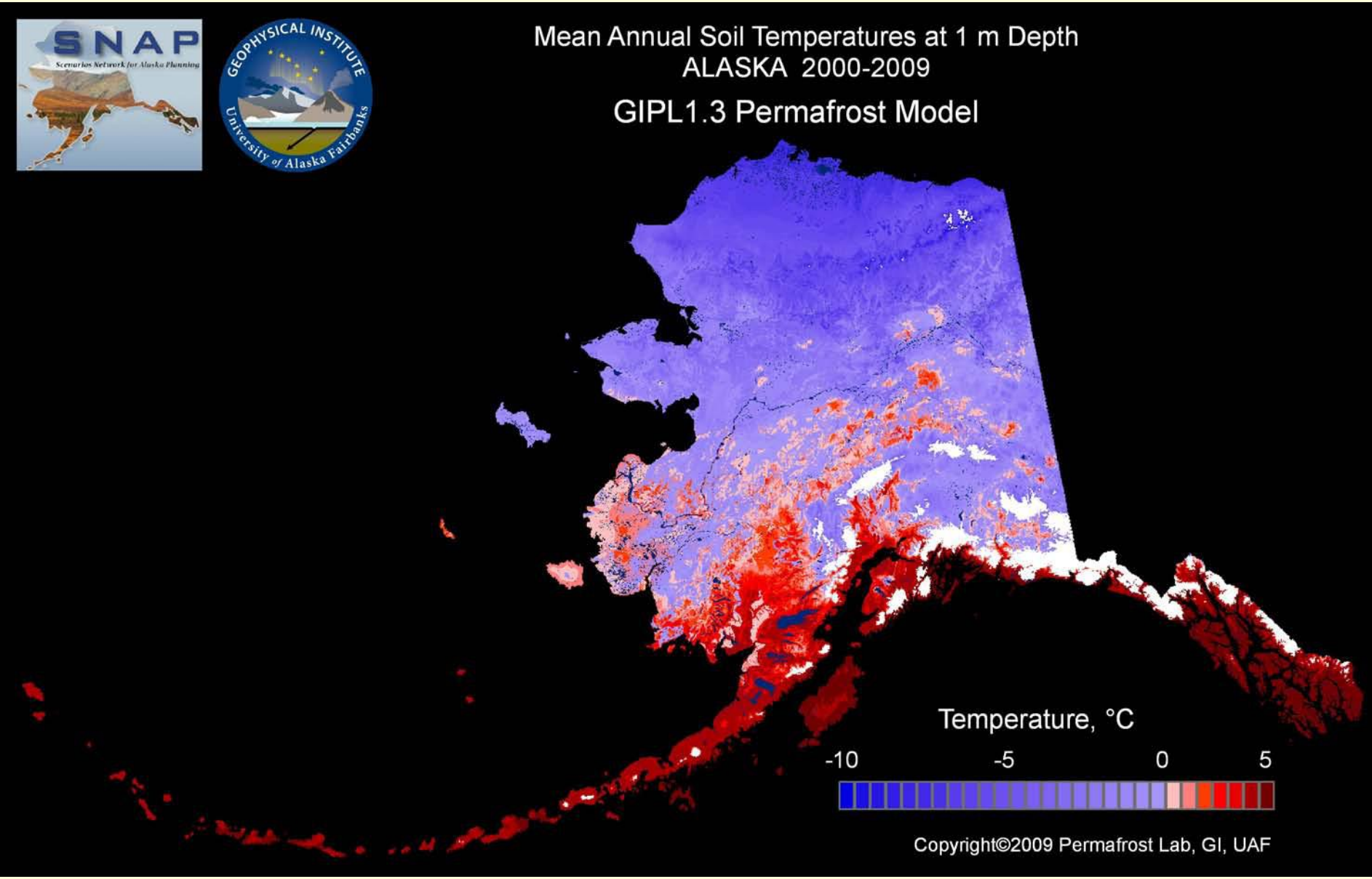
Comparing these two periods, 1961 – 1990, and 2010 – 2012, temperature has increased in every month. Biggest changes occurring in winter.

Wetter



Comparing these two periods, 1961 – 1990, and 2010 – 2012, precipitation has increased in ten of twelve months. Biggest change occurring in summer and fall.


SNAP
Scenarios Network for Alaska Planning
GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks
Mean Annual Soil Temperatures at 1 m Depth
ALASKA 1980-1989
GIPL1.3 Permafrost Model
Temperature, °C
-10
-5
0
5
Copyright©2009 Permafrost Lab, GI, UAF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GIPL1.3 Permafrost Model
Temperature, °C
-10
-5
0
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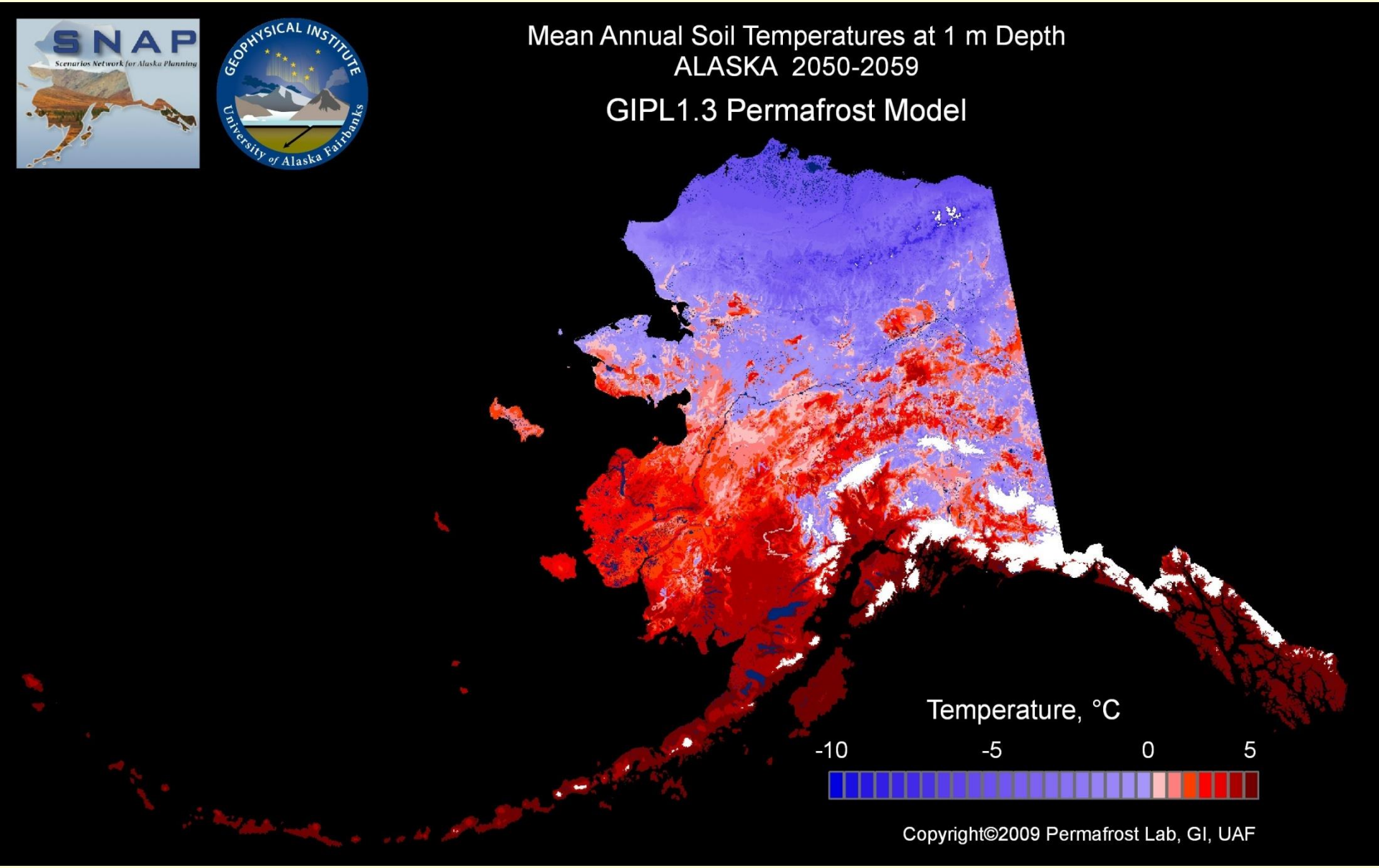

SNAP
Scenarios Network for Alaska Planning
GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks
Mean Annual Soil Temperatures at 1 m Depth
ALASKA 2050-2059
GIPL1.3 Permafrost Model
Temperature, °C
-10
-5
0
5
Copyright©2009 Permafrost Lab, GI, UAF

Coastal erosion

Photo by Ben Jones

Drying of tundra lakes

Photo V. Romanovsky

Thermocarst slumps

Arctic infrastructure failure


105


Freeze Up

Damaged sewage lagoon outfall and fence.


Slips and Falls

Property loss and safety

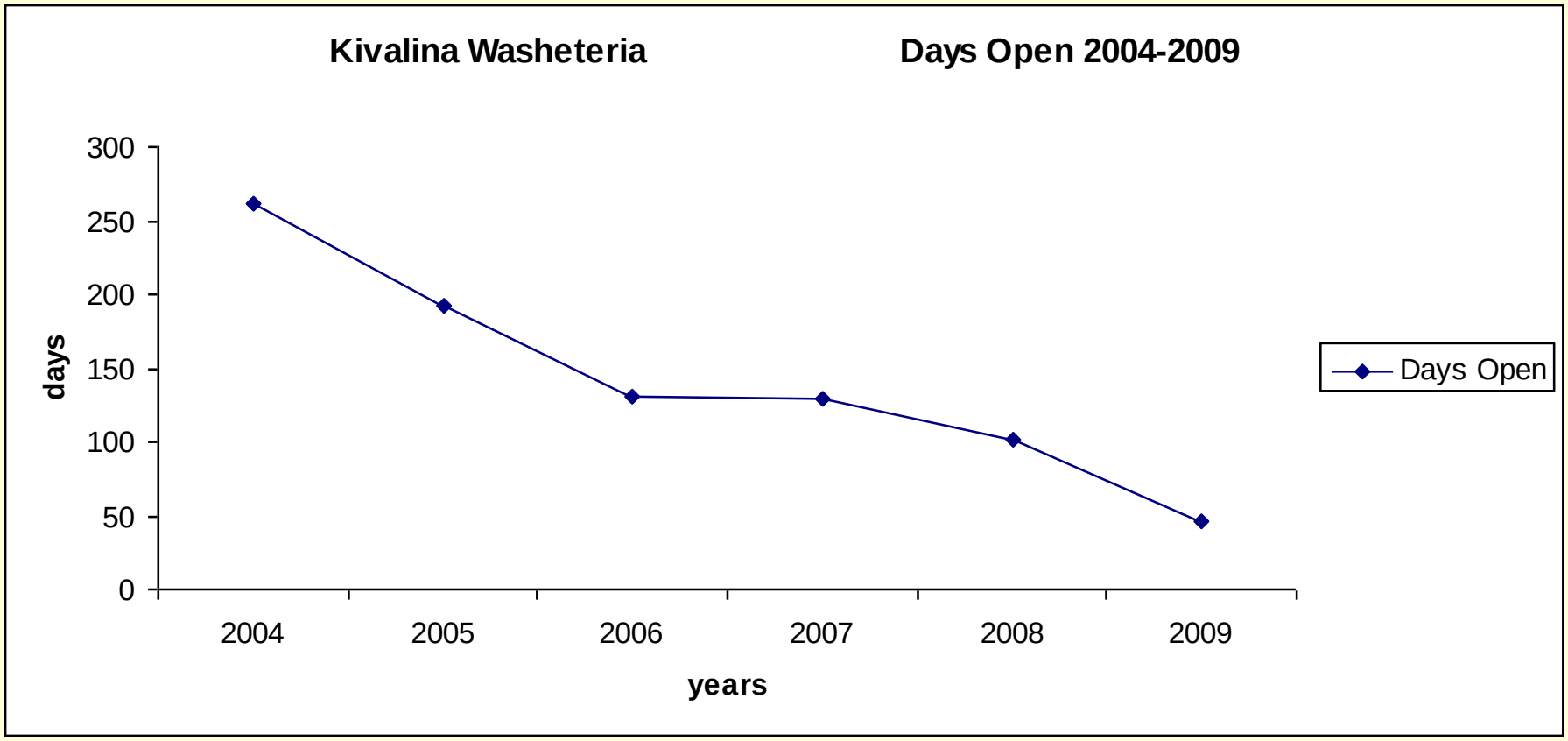
Kivalina Alaska


Kivalina October 2004
Kivalina by Millie Hawley


Kivalina October 2004

Child's Sea Wall

Kivalina Washeteria


Kivalina Washeteria
Days Open 2004-2009
300
250
200
150
100
50
0
days
2004
2005
2006
2007
2008
2009
years
Days Open

The Relationship Between In-Home Water Service and the Risk of Respiratory Tract, Skin, and Gastrointestinal Tract Infections Among Rural Alaska Natives

Thomas W. Hennessy, MD, MPH, Troy Ritter, REHS, MPH, Robert C. Holman, MS, Dana L. Bruden, MS, Krista L. Yorita, MPH, Lisa Bulkow, MS, James E. Cheek, MD, MPH, Rosalyn J. Singleton, MD, MPH, and Jeff Smith, MS, RS

Objectives. We investigated the relationship between the presence of in-home piped water and wastewater services and hospitalization rates for respiratory tract, skin, and gastrointestinal tract infections in rural Alaska.

Methods. We determined in-home water service and hospitalizations for selected infectious diseases among Alaska Natives by region during 2000 to 2004. Within 1 region, infant respiratory hospitalizations and skin infections for all ages were compared by village-level water services.

Results. Regions with a lower proportion of home water service had significantly higher hospitalization rates for pneumonia and influenza (rate ratio [RR]=2.5), skin or soft tissue infection (RR=1.9), and respiratory syncytial virus (RR=3.4 among those younger than 5 years) than did higher-service regions. Within 1 region, infants from villages with less than 10% of homes served had higher hospitalization rates for pneumonia (RR=1.3) and respiratory syncytial virus (RR=1.2) than did infants from villages with more than 80% served. Outpatient *Staphylococcus aureus* infections (RR=5.1, all ages) and skin infection hospitalizations (RR=2.7, all ages) were higher in low-service than in high-service villages.

Conclusions. Higher respiratory and skin infection rates were associated with a lack of in-home water service. This disparity should be addressed through sanitation infrastructure improvements. (*Am J Public Health*. 2008;98:2072–2078. doi:10.2105/AJPH.2007.115618)

Modern sanitation services (potable drinking water and safe wastewater disposal) are a cornerstone of public health progress and have contributed to decreased infectious disease morbidity and mortality. In 1950, 64.5% of US homes had complete sanitation services (a flush toilet, shower or bath, and kitchen sink).[1] This increased to 93.1% by 1970 and to 99.4% by 2000.[2,3]

In 2000, 93.7% of Alaskan homes had complete sanitation, which ranked Alaska last among US states.[3] In rural Alaska, where the vast majority of people are Alaska Natives, a much higher proportion lack basic sanitation facilities. Providing in-home sanitation services is difficult in remote villages where small, isolated populations live in a harsh, cold climate. Although many rural village homes lack in-home water service, nearly all villages have access to safe drinking water.[4] Significant gains in health status indicators have occurred among rural Alaska Natives; however, the ongoing disparity in sanitation services remains unsolved in most of rural Alaska. Furthermore, there is a disparity in

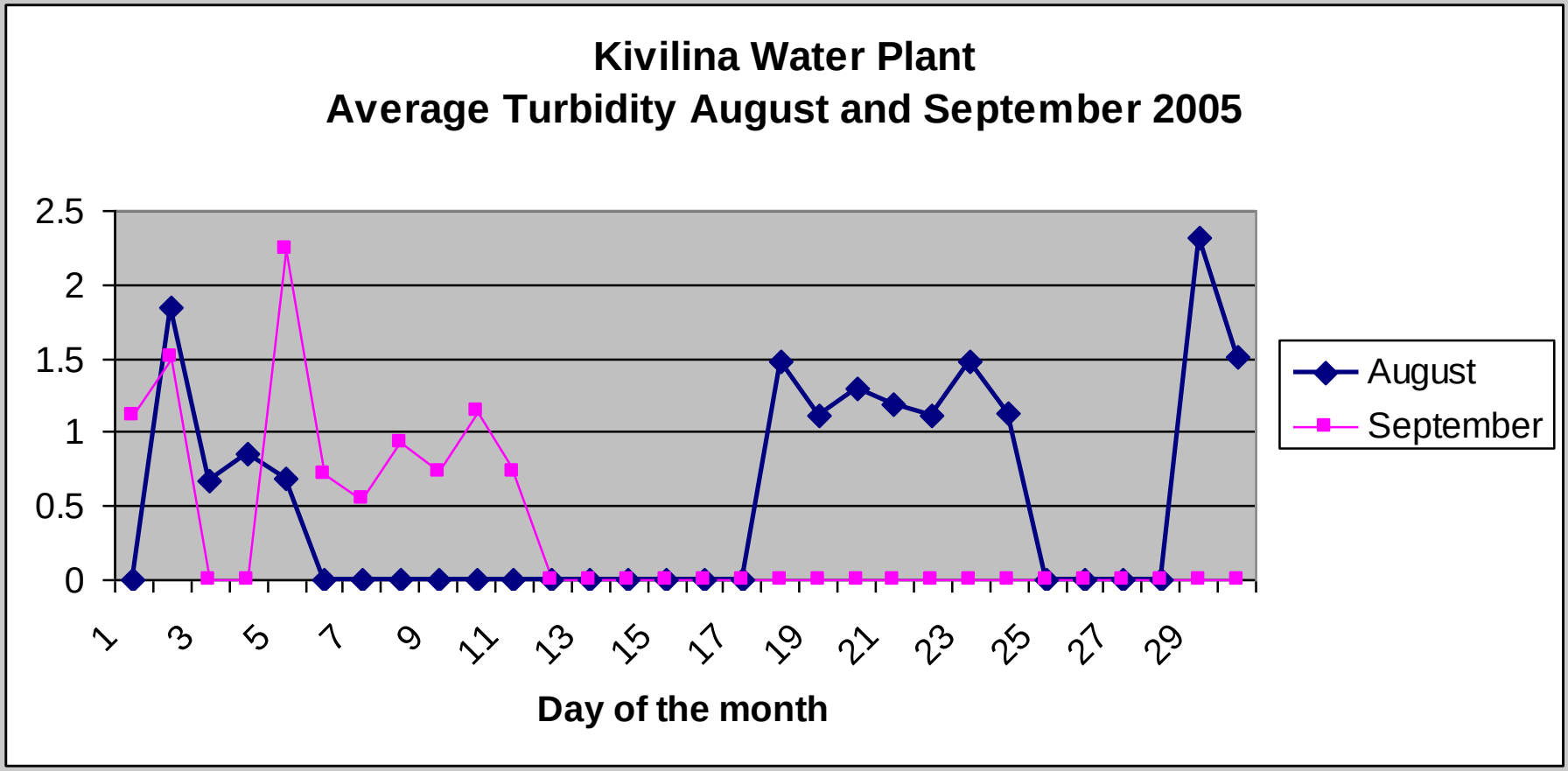
water service also lack flush toilets. Residents use outhouses or in-home waste containers commonly known as "honeybuckets" that require manual removal to a centralized waste disposal site or lagoon. Sanitation infrastructure

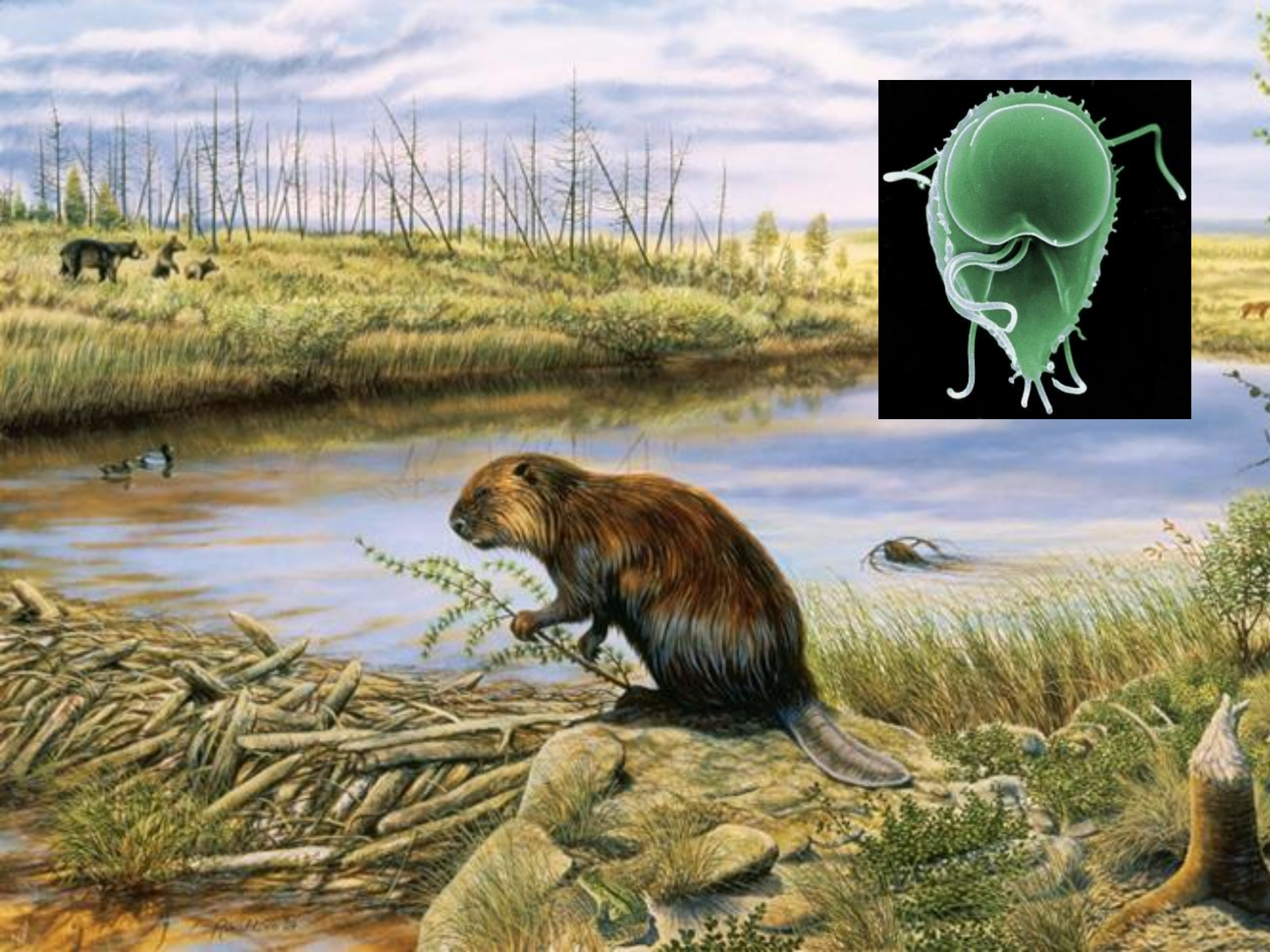
service and the risks of waterborne and water-washed infectious diseases in rural Alaska. We used existing sanitation service data for rural Alaska along with hospital discharge records, a respiratory disease surveillance system, and a


System Repair

River Erosion

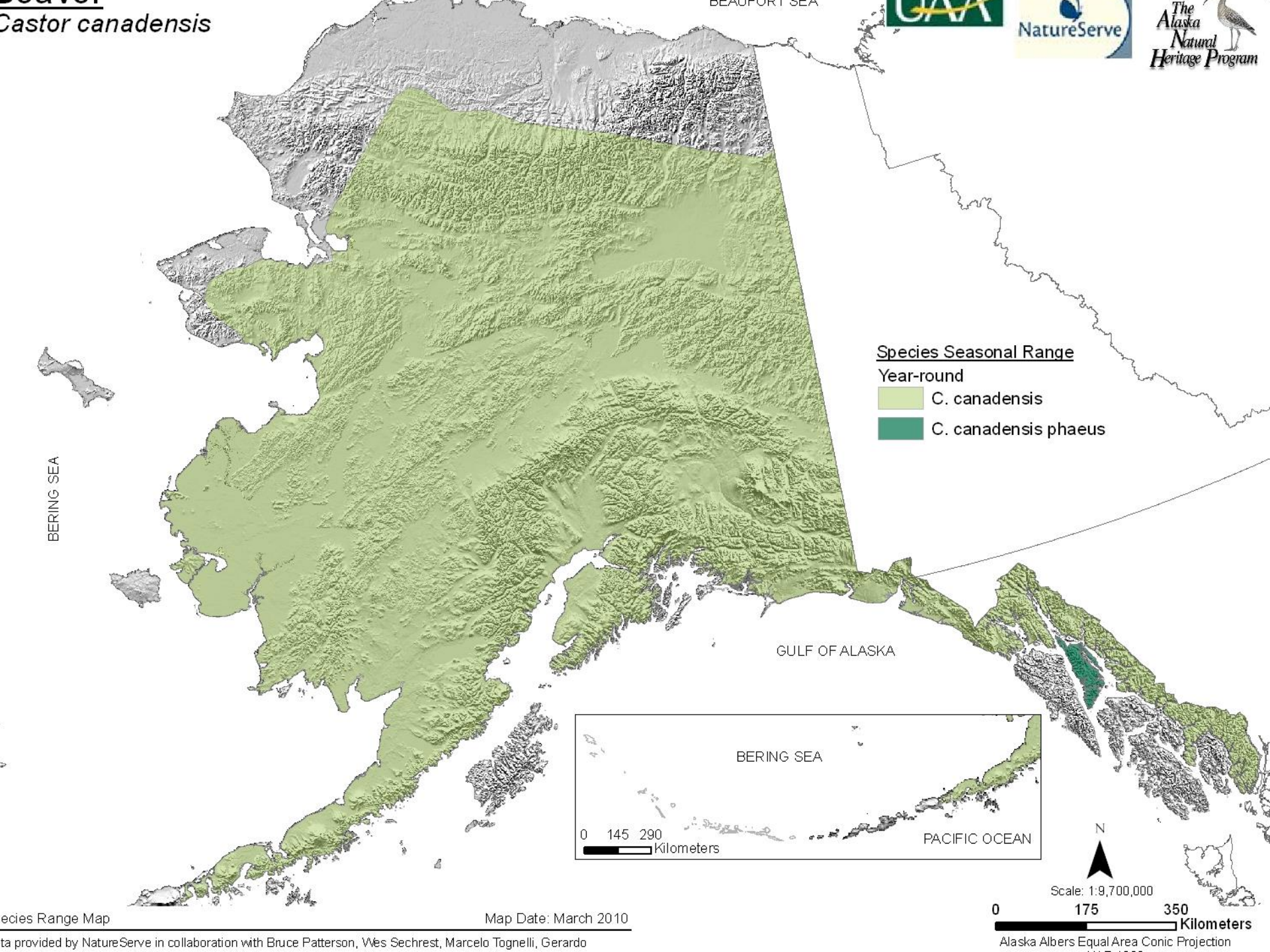
Community Water Intake - Erosion


Kivilina Water Plant
Average Turbidity August and September 2005
2.5
2
1.5
1
0.5
0
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
Day of the month
August
September



Beaver

Castor canadensis



ecies Range Map

Map Date: March 2010

ta provided by NatureServe in collaboration with Bruce Patterson, Wes Sechrest, Marcelo Tognelli, Gerardo


Evidence of Invasive Species.
Recent cases of giardiasis.

Food security is another important issue.


Drying meat.


Harvesting seal.

Traditional ice cellar.

Outbreak of *Vibrio parahaemolyticus* Gastroenteritis Associated with Alaskan Oysters

Joseph B. McLaughlin, M.D., M.P.H., Angelo DePaola, Ph.D., Cheryl A. Bopp, M.S., Karen A. Martinek, R.N., M.P.H., Nancy P. Napolilli, B.S., Christine G. Allison, B.S., Shelley L. Murray, B.S., Eric C. Thompson, B.S., Michele M. Bird, M.S., and John P. Middaugh, M.D.

"This investigation extends by 1000 km the northernmost documented source of oysters that caused illness due to V. parahaemolyticus. Rising temperatures of ocean water seem to have contributed to one of the largest known outbreaks of V. Parahaemolyticus in the United States."

ABSTRACT

BACKGROUND

Vibrio parahaemolyticus, the leading cause of seafood-associated gastroenteritis in the United States, typically is associated with the consumption of raw oysters gathered from warm-water estuaries. We describe a recognized outbreak of *V. parahaemolyticus* infection associated with the consumption of seafood from Alaska.

METHODS

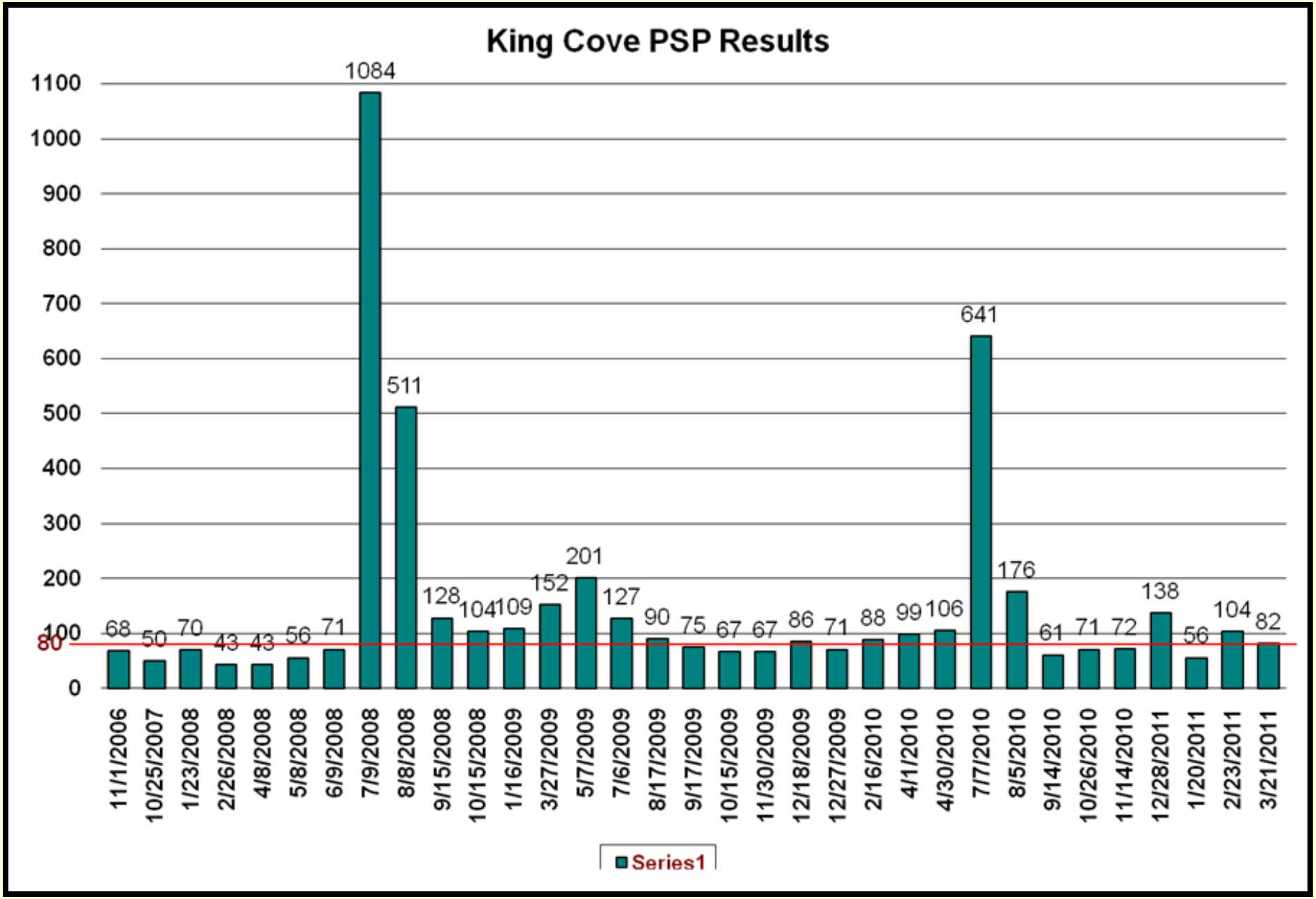
After we received reports of the occurrence of gastroenteritis on a cruise ship, we conducted a retrospective cohort study among passengers, as well as active surveillance throughout Alaska to identify additional cases, and an environmental study to identify sources of *V. parahaemolyticus* and contributors to the outbreak.

RESULTS

Of 189 passengers, 132 (70 percent) were interviewed; 22 of the interviewees (17 percent) met our case definition of gastroenteritis. In our multiple logistic-regression analysis, consumption of raw oysters was the only significant predictor of illness; the attack rate among people who consumed oysters was 29 percent. Active surveillance identified a total of 62 patients with gastroenteritis. *V. parahaemolyticus* serotype O6:K18 was isolated from the majority of patients tested and from environmental samples of oysters. Patterns on pulsed-field gel electrophoresis were highly related across clinical and

From the Division of Public Health, Alaska Department of Health and Social Services (J.B.M., K.A.M., J.P.M.); and the Alaska Department of Environmental Conservation (N.P.N., C.G.A., S.L.M.) — both in Anchorage; the Food and Drug Administration, Gulf Coast Seafood Laboratory, Dauphin Island, Ala. (A.D.); the Centers for Disease Control and Prevention, National Center for Infectious Diseases, Atlanta (C.A.B., M.M.B.); and the Washington State Department of Health Public Health Laboratories, Shoreline (E.C.T.). Address reprint requests to Dr. McLaughlin at the Division of Public Health, Alaska Department of Health and Social Services, 3601 C St., Suite 540, Anchorage, AK 99503, or at joe_mclaughlin@health.state.ak.us.

N Engl J Med 2005;353:1463-70.


King Cove PSP Results
1100
1000
900
800
700
600
500
400
300
200
100
0
80
68
50
70
43
43
56
71
1084
511
128
104
109
152
201
127
90
75
67
67
86
71
88
99
106
641
176
61
71
72
138
56
104
82
11/1/2006
10/25/2007
1/23/2008
2/26/2008
4/8/2008
5/8/2008
6/9/2008
7/9/2008
8/8/2008
9/15/2008
10/15/2008
1/16/2009
3/27/2009
5/7/2009
7/6/2009
8/17/2009
9/17/2009
10/15/2009
11/30/2009
12/18/2009
12/27/2009
2/16/2010
4/1/2010
4/30/2010
7/7/2010
8/5/2010
9/14/2010
10/26/2010
11/14/2010
12/28/2011
1/20/2011
2/23/2011
3/21/2011
Series1

Health Effects of Climate Change in Alaska

Allergic reactions

Dangerous travel

Poor Water Quality

Food Insecurity

Respirator Illness

Infrastructure damage

Ice hazard injury

Wildlife disease

Dangerous seas

Drought and Infestation

Unsafe food

Allergies

Snow hazards

Take Home Lesson

- Climate change is having wide range of effects on northern communities.
- A landscape once largely frozen and resilient is thawing and becoming fragile.
- Health effects include food and water security, changes in risk of injury and disease and mental health.
- Communities seek help in addressing climate change impacts.
- This is a new emerging field of public health with opportunities for students.

mbrubaker@anthc.org

Goggle us: "center for climate and health"